

Abstract of the Disclosure

[0076] A trapezoidal shaped single-crystal silicon prism is formed and permanently attached to an SOI wafer, or any structure including a silicon optical waveguide. In order to provide efficient optical coupling, the dopant species and concentration within the silicon waveguide is chosen such that the refractive index of the silicon waveguide is slightly less than that of the prism coupler (refractive index of silicon ≈ 3.5). An intermediate evanescent coupling layer, disposed between the waveguide and the prism coupler, comprises a refractive index less than both the prism and the waveguide. In one embodiment, the evanescent coupling layer comprises a constant thickness. In an alternative embodiment, the evanescent coupling layer may be tapered to improve coupling efficiency between the prism and the waveguide. Methods of making the coupling arrangement are also disclosed.